...EDICAL LIBRARY JUL 5 1946

Volume VII JULY, 1946 Number 7

DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

CONTENTS:

A STUDY OF PROBLEMS ENCOUNTERED BY NEUROPSYCHIATRIC SOLDIER PATIENTS ON THEIR FIRST VISIT HOME 197
Benjamin Simon, Lt. Col., M.C. and Jules D. Holzberg, 1st Lt., M.A.C.

BRAIN FACILITATION NOT BRAIN DESTRUCTION, THE AIM IN ELECTROSHOCK THERAPY 201
Paul H. Wilcox, M.D., Traverse City, Michigan

PEDAGOGICAL GROUP PSYCHOTHERAPY 205
J. W. Klapman, M.D., Chicago, Illinois

HYDROCEPHALUS: Classification and Diagnosis 209
James Greenwood, Jr., M.D., Houston, Texas

THE GENESIS OF COMBAT FATIGUE 211
E. W. Cochran, M.D., Galveston, Texas

NEUROLOGICAL CLINICAL PATHOLOGICAL CONFERENCE 216

TWO IMPORTANT POST-WAR PROBLEMS IN NEUROLOGICAL SURGERY 221
Ernest Sachs, M.D., St. Louis, Missouri

SANATAIRA

ASSOCIATE EDITORS

A. E. Bennett, M.D. ..... Omaha, Nebraska
Francis J. Brackland, M.D. ..... Philadelphia, Penn.
Franklin G. Ebaugh, M.D. ..... Denver, Colorado
Temple Fay, M.D. ..... Philadelphia, Pennsylvania
Milton H. Erickson, M.D. ..... Eloise, Michigan
Hamilton Ford, M.D. ..... Galveston, Texas
Walter Freeman, M.D. ..... Washington, D. C.
George T. Harding, M.D. ..... Columbus, Ohio
Jas. K. Hall, M.D. ..... Richmond, Virginia
A. Hauser, M.D. ..... Houston, Texas
Louis J. Karnosh, M.D. ..... Cleveland, Ohio
Jacob Kasanin, M.D. ..... San Francisco, California
Frank H. Luton, M.D. ..... Nashville, Tennessee
Wm. Malamud, M.D. ..... Worcester, Massachusetts
Karl A. Menninger, M.D. ..... Topeka, Kansas
Adolf Meyer, M.D. ..... Baltimore, Maryland
Glenn Myers, M.D. ..... Los Angeles, California
Hans H. Reese, M.D. ..... Madison, Wisconsin
Theodore A. Watters, M.D. ..... New Orleans, La.
S. Bernard Wortis, M.D. ..... New York, N. Y.

Titus H. Harris, M.D.
Galveston, Texas
Editor-in-Chief

YEARLY SUBSCRIPTION $2.50
SINGLE COPIES 25 Cents
FOREIGN SUBSCRIPTION $3.00

George Biegair, B.S., LL.B.
Chicago, Illinois
Managing Editor

THE
RING SANATORIUM AND HOSPITAL
Arlington Massachusetts

Eight miles from Boston at an elevation of 400 feet

Specializing in the individualized care of Neuropsychiatric illnesses and Habit conditions. All accepted Therapies under the direction of a resident medical staff and trained assistants. Cottage plan permits a variety of accomodations.

67th Year

VOLTA ROSS HALL, M.D.
Medical Director

HALLAM T. RING
Administrator

In conjunction: The Ring School of Attendant Nursing

THE HARDING SANITARIUM
WORTHINGTON, OHIO

For Nervous and Mental Disorders

NINE MILES NORTH OF STATE HOUSE — COLUMBUS

GEORGE T. HARDING, M.D., *Medical Director*

HARRISON S. EVANS, M.D.
CHARLES L. ANDERSON, M.D.
HAROLD CAVINESS, M.D.
HENRY E. ANDREN, M.D.

Telephone: Columbus FR. 2-5367

COMPTON SANITARIUM
AND
LAS CAMPANAS HOSPITAL
COMPTON, CALIFORNIA
(Near Los Angeles)

Compton Sanitarium is a private psychiatric hospital with 120 beds. Emphasis is given psychotherapy by a staff of resident phychiatrists. Other treatment procedures are duly evaluated and administered. Careful records are maintained. There are psychiatrically trained graduate nurses; student nurses through affiliation; nursing attendants; dietitian; ocupational therapist; recreational therapist; hydrotherapist; masseuse. Las Campanas Hospital (43 beds) provides adjunct general hospital facilities. Compton Sanitarium and Las Campanas Hospital are approved by the American College of Surgeons.

GLENN MYERS, M.D.
Medical Director.

Beverly Hills Sanitarium

for

The Study and Treatment of Nervous and Mental Diseases

218 No. Westmoreland DALLAS 11, TEXAS Telephone 9-3114

This sanitarium is a psychopathic hospital with a home-like environment and is equipped to treat psychiatric and neurological cases in a most scientific manner by means of psychotherapy, occupational therapy, recreational therapy and physiotherapy, including hyperpyrexia, insulin and metrazol treatments in special conditions.

ARTHUR J. SCHWENKENBERG, M.D.
Attending Neuropsychiatrist

JANE N. CREEL, M.D.
Resident Physician

VOL. VII JULY, 1946 No. 7

EDITORIAL OFFICES
UNIVERSITY OF TEXAS SCHOOL OF MEDICINE
800 AVENUE B., GALVESTON, TEXAS

BUSINESS OFFICES
PHYSICIANS POSTGRADUATE PRESS
500 NORTH DEARBORN ST., CHICAGO 10, ILLINOIS

COPYRIGHT, 1946 BY
PHYSICIANS POSTGRADUATE PRESS

DISEASES of the NERVOUS SYSTEM

(PUBLISHED MONTHLY)

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

A Study of Problems Encountered by Neuropsychiatric Soldier Patients on their First Visit Home

BENJAMIN SIMON, LT. COL., M.C.*
JULES D. HOLZBERG, 1st LT., M.A.C.*

During January 1945 this hospital granted furloughs up to 21 days duration to a relatively large number of its open ward neuropsychiatric patients. Since for most of these patients, this was their first opportunity to be home for an extended period following overseas and combat experience, it was thought desirable to ascertain the patients' attitudes toward their visits home.

A questionnaire was submitted to one hundred and fifty open ward patients who had recently returned from their furloughs. Most of these were psychoneurotics, with a small number of moderately adjusted psychopaths and remitted psychotics. To assure maximum frankness and honesty of expression, the patients were not required to sign the questionnaire. To confirm this impression, the following statement appeared on top of the sheet:

"Your frank opinions on this questionnaire, based on your experiences during your furlough, can help other soldiers who will follow you in this hospital.

"Your name will not appear on this form, nor at any time will your name be used. You can feel entirely free to answer with complete frankness."

The men were requested to answer twelve queries regarding their furlough experiences. Many questions concerned administrative phases of granting furloughs, but only those questions are analyzed which relate to actual experiences while at home. Analysis of the explanations was made with two objectives in mind, i.e., (1) to discover the predominate trends, the major categories into which explanations fall; (2) to select any rare or unusual explanations.

Item 1. Do you believe that most patients should be given a furlough during their stay at this hospital? Explain.

	Yes	*No*	*No Response*
Per Cent	87.3	11.9	0.8

An overwhelming majority stated that furloughs should be given during hospitalization. Approximately one-tenth of the men could see no good reason for going home. Of the 123 patients who qualified their affirmative responses to Item 1, about half (62) stressed the simple joy of getting away from the hospital and into a civilian atmosphere. Many pointed out the therapeutic effects of the furlough as exemplified by the following excerpts:

"Gives patient a chance to gain back a little poise, lose awkwardness created by being closed in. . . ."

"To give them a chance to see what it's like being out. Some may even want to go back to duty after seeing how things are on the outside."

"It helps a patient find himself easier. It is also better for his ward officer to diagnose his trouble after a furlough. Relieves tension."

"Helps to relieve the strain of waiting and renews home associations."

*Neuropsychiatric Service, Mason General Hospital, Brentwood, New York.

A large group (45) pointed out the desirable reactions flowing from relationship with home and family, e.g.:

"No matter how sick a man is, he wants to go home even if he has to crawl."
"Home is a good place to rest without anyone bothering you. The good food (home cooking) is very good to build you up again. The environment of home helps a great deal."

Three patients gave highly social responses, illustrated by the following:

"Helps the folks at home to know what you are like and relieves their mind and saves worry."

The 13 qualified negative answers to Item 1 are predominately based on a preference for hospital disposition before furlough, e.g.:

"Some patients feel worse when they come back for the reason they have to come back. What they all want is a quick decision in their case."

Three indicated definite disturbances created by the furlough, e.g.:

"Because it makes a man realize how foolish the people consider him for doing his fighting."

Item 2. Do you think your furlough helped improve your condition? Explain.

	Yes	*No*	*No Response*
Per Cent	59.4	37.9	2.7

More than half indicated that going home affected their conditions favorably. About one-third reported that the home visit did not improve their condition and some of these thought it had hurt them. Eighty men explained why they believed that furloughs helped them. The reasons were about equally divided between two categories: the therapeutic value of reidentification with the non-Army world; the benefits derived from temporary freedom from hospital routine:

"To be able to get out and be with people again and have a good time helped a lot."
"It was wonderful to be among my family again."
"No one to bother you. No orders, no pests around. Come and go as you please. Eat when you're hungry."

Of the 39 qualified negative answers to Item 2, 18 evidenced anxiety concerning the future:

"Worse when I knew I had to come back. Could think of nothing else the last few days."
"Because of uncertainty and waiting—not knowing the score."

Six held there was insufficient time for observable improvement:

"Too short a time to note any improvement."

Item 3. Was it just as easy to get along with your family now as it used to be? Explain

	Yes	*No*	*No Response*
Per Cent	60.6	30.7	8.7

Approximately 60 per cent expressed no problems of maladjustment with regard to their families, while 30 per cent found difficulty in readjusting. This question drew forth one hundred and ten qualified responses, six of which expressed indecision:

"Yes and No. Often being away for a time makes you think either you or they have changed."

The majority (67) explained why it was just as easy to get along with families as formerly. Most of these explanations stressed the fact that there exists no essential change:

"No friction in family, therefore, no difficulty for me."
"There isn't any change in me or my family, it shouldn't be any different."
"Because I never had trouble with them."
"Hell yes. My ways have never changed."

Sixteen patients felt that special intellectual factors facilitated the adjustment:

"They were intelligent enough and broad minded enough to understand and try to help me along."
"They understood me perfectly—there didn't seem to be a change in them—my condition was to blame, mostly—I was easily irritated and excited."
"There was no difficulty whatever. I was fortunate my family did not ply me with questions."
"Because my wife is very understanding. There were difficult matters, but before the furlough was over, we understood each other again."

Fifteen men found new emotional factors which accelerated adjustment:

"In my opinion it was easier. I was appreciated more after being away so long."
"A soldier gets along better. He knows what a home is and what a family really means, and you are both willing to sacrifice for each other."
"When you come back from overseas your

family does everything they can to make you happy more than before."
"For the simple reason that absence makes the heart grow fonder."

Of the 37 who explained their negative responses to Item 3, almost two-thirds expressed the opinion that they have changed, that they are emotionally unstable. Several relate their emotional instability directly to Army experiences. Examples of these categories are:

"Being emotionally unstable I found it difficult at times to agree with my family."
"My nervous condition has brought my temper to extremities! I found it hard to get along with people in general."
"The soldier is very nervous after what he has been through and will not be able to adjust himself properly for quite a time."
"Because I was irritable and it was very very easy for me to blow-up."
"It was quite hard to control nerves and also know what to say to them. They also didn't know exactly what to ask."

Eleven attributed their maladjustment to the fact that the family did not understand them, were worried or frightened:

"My family saw a change in me and were greatly worried about my condition."
"After being in combat so much and coming down with war fatigue it's hard to have people show so much love for you and wait on you so often, besides asking foolish questions."
"I was treated too easily, and too much as if I were especially apart from ordinary because I had been overseas, otherwise, yes."
"They changed a lot, they don't realize that you don't want to be babied any more."

Item 4. Was it just as easy to get along with your civilian friends now as it used to be? Explain.

	Yes	*No*	*No Response*
Per Cent	52	40	8

Slightly more than half expressed no difficulty in their relationships to friends, while 40 per cent found it was difficult to get along with them. Twenty-eight attributed their inability to get along with former friends to the civilians' morale, behavior, or lack of understanding:

"They all ask you a lot of questions."
"Some of them think we still owe them something. We did our share, let them do theirs."
"They don't show a sense of appreciation in many respects."

Ten stressed important differences between their world and the civilian world:

"I found it hard to carry on a conversation due to lack of common interests because of being in a hospital so long."
"Civilian friends are different, and make one feel very distant."
"Because there has been a gap. Three years of Army life changes your outlook. On the whole a feeling of awkwardness on your part and an embarrassment on the part of the civilian was the relationship."

Nine referred to their own disturbances:

"I don't know what happened but at times I wouldn't want to talk to anyone."
"Small things annoy me very much even though I know they shouldn't."
"I found it hard to get along with my friends, especially girls. I can't explain why. I guess it was because I spent the last three years in the jungle."

Nineteen found no difficulty with civilians because they had little contact with them:

"Most of my civilian friends were in the armed forces and what other few there were I did not see or remember."
"What ones I could find."

Fifteen found it easier to adjust because their civilian friends made special efforts to be nice:

"Friends all seemed to be the same toward me and some a lot nicer in many ways."
"Definitely yes. Because they side with us. Therefore, everything we say or do it accounts for it. If you get what I mean."
"Quite naturally, everyone was glad to see us, but!"

Twelve found adjustment easy because there was no change:

"Only one friend (male) was home, and relationship between us friendly as formerly."
"My friends that are left were glad to see me back."
"Once a friend I can always get along with them."

Item 5. What were the advantages, if any, you found in receiving the furlough at this time? Explain.

The majority of the 22 patients who found no advantage in the furlough, did not qualify their responses. Forty felt the greatest advantages to be physical—relaxation, food, and sleep:

"Good food—Relaxation! Plenty of sleep!"
"Living once again at ease."
"Helped to relieve routine strain of Army life."

Thirty found the greatest advantage to be in their opportunity to visit the family:

"Being home with Mom and Dad."
"To see the ones you always thought a lot of and never expected to see again."

Ten asserted that the chief advantage was the relief afforded families:

"Being given a furlough at this time made my family and friends feel that I was in good health again and there was nothing wrong with me."
"Because I needed one very bad right now, I mean furlough, because my mother is sick."

One answer in particular is worth noting:

"It proved to patient his future was secure. It showed him how careful he must be in the future not to overdo. It provided opportunity to lay plans."

Item 6. What were the disadvantages, if any, you found in receiving the furlough at this time? Explain.

Uncertainty as to the future was considered the chief disadvantage by many men:

"The disadvantage was to have civilian life, then to return to the hospital, knowing nothing different of my disposal than seven months ago."
"None with the exception it prolonged the disposition of your case and you were anxious as to your disposition."
"None except coming back to the hospital in the same mental state of not knowing what will happen to you."

Other disadvantages noted were:

"People asked me too many questions about other soldiers that were with me over there."
"Facing people you knew and the fear of asking them how their soldier son, husband or brother was—not knowing their whereabouts or if they were a casualty or not."
"Finding out that so many people don't care if the war ever ends."

Item 7. Did the furlough cause any special problems for you? Explain.

	Yes	*No*	*No Response*
Per cent	48.6	40.7	10.7

Slightly less than half stated that they had encountered special problems at home, while approximately 40 per cent found none. Of 65 who explained the special problems created, many cited their difficulty in accounting for their hospitalization:

"Explaining why I am in the hospital."
"Explanations as to why I am in the hospital."

Uncertainty as to the future was also frequently listed as a major problem:

"Yes, I wanted to get married but didn't know whether I was going back into this damn Army."

Delay in hospital disposition was mentioned:

"A fellow has to wait too long after he comes back to get boarded."

Several unusual, personal problems were cited:

"What will happen to me, will I go nuts again."
"Had problem of whether or not to be married while still being a patient."
"Found my family wants nothing to do with me. My wife also left me."

Nineteen explained their "No" answers to Item 7. Representative examples are:

"Everything seemed normal and I did things as I had planned to do. Therefore I was contented."
"It did more good than all the hospitals."
"Everything turned out fair."

Summary and Conclusions

1. The overwhelming majority of neuropsychiatric soldier patients expressed a strong desire to get home while on patient status.
2. However, almost 40 per cent stated that getting home did not result in a change for the better in their condition.
3. Approximately 30 per cent experienced difficulty in making a readjustment to their families.
4. An even greater percentage (40 per cent) found it difficult to readjust to friends.
5. Approximately 50 per cent experienced special problems of one kind or another in their stay at home.
6. Thus, consistently, 30 to 50 per cent of the neuropsychiatric soldier patients found the process of readjustment to a civilian setting a difficult one, emphasizing the problems in adjustment that neuropsychiatric dischargees must face.
7. While control findings on soldiers and non-neuropsychiatric patients are not available there is a strong likelihood that they will face similar difficulties, in perhaps a lesser degree.

Brain Facilitation not Brain Destruction, The Aim in Electroshock Therapy

PAUL H. WILCOX, M.D.
Traverse City, Michigan

Brain stimulation resulting in facilitation, not brain destruction, should be the aim in the therapy of most mental diseases. There is a prevailing assumption that therapy of certain types of mental diseases must or can be accomplished only by destroying brain cells. This article outlines briefly the development of this concept of therapeutic destruction. Then evidence is presented to show that electrostimulation of brain cells *within physiological limits* can result in *facilitation* of otherwise inhibited brain response patterns, leading to clinical improvement.

History

The general history of shock therapy in mental disorders is now quite familiar. Sakel[1] in Vienna started insulin shock therapy. Meduna[2] in Budapest developed chemical convulsive therapy using intramuscular camphor in oil and later intravenous metrazol. Cerletti and Bini[3] in Rome began electroshock convulsive therapy. All agree that early treatment improves the prognosis. Using relatively low intensity pulsating direct current (modified half-wave rectified 60 cycle current) for electrostimulation, the author finds benefits in more diversified types of mental illness than is usually reported from the use of the Cerletti-Bini technique which uses relatively high intensity 60 cycle alternating current. In any case, it is generally accepted that in major mental disorders therapy must be forceful and persistent if it is to be effective.

Moniz[4] in Lisbon started the frank destructive approach to mental disorders with his prefrontal leucotomy. The extensive efforts of Freeman and Watts[5] and others with improved technique, called prefrontal lobotomy, have demonstrated that an amazing number of the prefrontal-thalamic fibers can be cut without measurable disturbance of personality function and that severing of most of the prefrontal thalamic fibers is often required before profound emotional tensions can be relieved by this operation. This surgical approach has served to develop and to substantiate the belief that destruction is the basis of the improvement in patients treated with insulin coma and with the convulsive therapies (Freeman and Watts,[5] p. 233). This belief has become sufficiently current so that it is not unusual to hear prominent psychiatrists and neurologists express the opinion that improvement from any of the shock therapies in certain mental conditions must necessarily depend upon brain tissue destruction.

Tietz, et al[6] have attempted to make the method of electrostimulation therapy approach insulin coma therapy in severity by their electronarcosis technique. Their technique, which involves seven minutes of continuous stimulation, amounting to about 42,000 milliampere seconds of 60 cycle a.c. current, so completely exceeds previous therapeutic methods in the amount of electrical energy applied to the brain that the amazing tolerance of the brain for electrical currents is revealed.

Berkwitz[7] developed a subconvulsive technique by the use of electrostimuli which were small in terms of energy, but it is generally accepted that convulsions are necessary for the best results. Friedman and Wilcox[8] introduced slightly modified half-wave rectified 60 cycle current and found that convulsions could be produced with that current with about one-fifth of the electrical energy used by the Cerletti-Bini technique. The clinical value of convulsions produced by this technique has been substantiated in a number of hospitals.[10] Applying the neurophysiological principles of threshold excitability of nerve units, Liberson and Wilcox[11] demonstrated that convulsions can be obtained with one-twenty-fifth the energy used in the Cerletti-Bini technique. The clinical evaluation of this and other minimal current types is under way.

Technique

The technique of electroshock convulsive therapy as it has now been developed by the

author is as follows: The patient is held in a supine position with his back slightly hyperextended, the elbows close to the sides and the shoulders held down to the bed. Small metal electrodes are held by the nurse, who wears rubber gloves, to the chosen areas of the scalp which have been prepared by an application of 1 per cent saline jelly. The current is adjusted and controlled by the therapist. Usually 80 to 100 milliamperes of this current, as measured by an ordinary direct current milliammeter is applied for approximately one second. The stimulus is terminated by releasing the push button when the patient is observed to be at the verge of a convulsion. If the dose has been underestimated, it is promptly apparent and the circuit is quickly closed again for an instant to produce a convulsion.

When the electrodes are applied to the vertex-positive left-temple-negative position, the average threshold convulsive dose is about 60 milliampere seconds. When the electrodes are applied to the right-temporo-frontal - positive left-temporo-frontal-negative position, the threshold convulsive dose is about 100 milliampere seconds. The latter position tends to disturb the memory during the post-convulsive period of susceptible patients more than the former position but in patients who tolerate the latter position without particular memory disturbances there seems to be greater gain for each treatment. The purpose is to give the maximum stimulation which will not result in any subjective memory disturbance for more than an hour after the treatment. Many patients return to their regular occupation the day after treatment and a few wish to go back to work the same day. Complaints about forgetting details of their work and general confusion are rare. When they do occur the technique is modified by applying the treatment to the vertex-positive left-temple-negative position if that is not the original position or by reducing the current to 70 milliamperes with a somewhat longer duration. The latter procedure further reduces memory disturbances.

As the threshold convulsive stimulus approaches the minimum current limit or rheobase, a combination of low strength and long duration of the stimulus current can be reached in which the patient remembers the convulsion as a definitely disagreeable experience and in some cases the patient has actually retained consciousness during the clonic phase. The ideal equation is that which produces complete amnesia for the convulsion without any retrograde amnesia and without residual memory disturbances. In practice this balance can be readily attained through the procedures outlined. The program is to treat the patients daily until signs of improvement appear and then to space the treatments according to the individual patient's needs in order to maintain a nearly steady progressive improvement to the point of rehabilitation. When a satisfactory improvement has been reached, it is still desirable to keep the patient under observation while he is making a normal work adjustment for at least three weeks after the last treatment in order to resume treatments at the first sign of relapse.

A detailed analysis of the results of the above treatment program is under preparation and will be published later. Our results on psychoses of recent onset are very good but most chronic patients cannot be rehabilitated even by these methods.

Brain Facilitation

On the basis of over 20,000 treatments given at the Traverse City State Hospital and certain studies elsewhere[9] the author wishes to propose an excitation and facilitation theory of therapy as opposed to the widely held destruction theory. An analysis of the response patterns from convulsions produced by our method has been published.[12] This presented the evidence that the syndrome was primarily one of cortical excitation. Proctor and Goodwin[9] observed that the patients showing the best clinical response to the treatments showed the least evidence of slow wave change in the electroencephalograms. This coincides closely with the clinical impression of the author that patients do not need to develop residual confusion, beyond the immediate reorientation phase, in order to recover from their mental illness. Unpublished studies at Traverse City State Hospital disclose definitely less evidence of a transitional organic pattern in the Rorschach responses during the

immediate postconvulsive period than were reported by Lowenbach and Stainbrook[13] from their material using Cerletti-Bini methods.

The present article seeks to inquire into what mechanisms could explain a therapy which results in patients with widely differing mental disturbances returning to a normal state. Auditory and visual hallucinations often disappear, paranoid feelings often fade, elation and overactivity often are replaced by normal behavior, depression and retardation often are replaced by a normal mood and rate of activity, hypochondriacal symptoms and conversion symptoms often disappear and the neurasthenic frequently recovers normal energy resources.

The author has been impressed that this therapeutic method releases some intrinsic normalizing or homeostatic process in the patients. Psychotherapy, occupational therapy, and rehabilitation programs become effective in patients previously inaccessible to such approaches. The Traverse City State Hospital program includes a limited amount of intermittent direct psychotherapy by the doctor and an intensive socializing policy, including arrangements for remunerative employment[14] in the community for the patients during their convalescence before being paroled home.

Pavlov[15] discussed the psychiatric implications of his conditioned reflex theories. He found good evidence that under certain circumstances there is a complete isolation of points of the cortex which are functionally pathological at the etiological moment (p. 161). He found also that some excitation patterns become stereotyped under certain conditions and acquire what he terms "pathological inertness". Similarly, conditioned reflexes may go into an ultraparadoxical phase which is comparable to pathological negativism in human beings. He uses the term "dynamic stereotypy" to describe special states in his experimental dogs. He applies the term narrowly to his experimental data but it seems useful as a term to describe the ever changing yet perseverating mental pattern of a person. For instance, if a person is going to his office there is a definite tendency to persevere toward that goal. That is the "stereotypy" aspect. Certain patterns of motor coordination and thinking tend to recur in order to achieve the goal. However, the person is susceptible to influences which may change his plans. These influences may be internal or external. This is the "dynamic" aspect of the mind-set at the moment. Pavlov elaborated the complex unconditioned and conditioned reflexes which go into the dynamic stereotypy at any moment. It is easy to visualize situations which are judged unstable because the dynamic stereotypy is too labile, too "dynamic"—too easily changed by internal and external influences. Likewise one can conceive of mental patterns which are too inflexible, too stereotyped, for efficient adjustment to the circumstances.

From moment to moment the mind-set changes, but within understandable limits. Those limits are determined by concurrent inhibitory excitation patterns of the brain. In the relatively normal function of the brain there is an extremely complex and extensive series of brain cell excitations associated with every stimulus. The focus of conscious activity can be shifted readily over innumerable aspects of the excitation network. For example the word pencil can be considered as a complex stimulus variously conditioned. Reflection readily discloses that that stimulus causes direct and indirect excitation of all areas of the brain: visual, sensory, motor, auditory, olfactory, as well as the association areas which give rise to abstract meanings related to "pencil". The normal functioning of the brain allows one to deal freely with the innumerable aspects of the concept "pencil". However, situations can be conceived in which the concept of "pencil" could be complicated by an inhibitory process so that the individual would find areas of association in reference to it blocked or inhibited. That cortical inhibitory patterns do interfere with freedom of association is readily appreciated.

The similarity between many psychotic symptoms and ordinary dream experience has been noted by various writers. Many hallucinations and delusions would be commonplace in dreams. It is, therefore, possible that some inhibitory process may interfere with the usual modes of discrimination between dream experiences and external impressions. Furthermore, the profound depressions are not different qualitatively from many fleeting moods normally occurring in everyone.

The difficulty arises in an inability to correct the feeling by means of the memory of past pleasures or by the ordinary expectation of a better future. There seems to be a barrier which can be considered inhibitory between the stereotyped mood and the usual modifying influences. The inhibitory process in this case is of a different sort from the superego and ego inhibitions which are part of the normal control of activity. This pathological inhibitory process interferes with the integration of the various parts of the brain and personality.

These conceptions make possible some theoretical unification of various pathological mental processes. It becomes a question of how to facilitate those brain cell networks blocked by the inhibitory networks. A nonselective approach would be to stimulate all brain cells equally thus giving them all a more equal chance to exercise their normal function in relation to one another. Such stimulation might bring into play certain intrinsic restorative tendencies in the personality which had been blocked during the psychosis. The tissues of the body tend to heal when injured. Though the brain cannot reconstruct destroyed brain neurones, it can and does reverse many neurone conditions and effectively reorganizes neurone functioning. Therefore it can be stated that the brain and personality have a natural tendency to what may be called functional repair and reorganization. In chronic mental disorders the tendency to self-healing is overlooked but cannot be disregarded. It is not clear in just what way some mental diseases tend to become chronic and more resistant to all forms of therapy. However, the author believes that he can account for his favorable results, with the techniques of electrostimulation which he used, on the theory that he is stimulating the brain within physiological limits and is thereby producing a facilitation of integrative brain patterns previously inhibited by the pathological process.

Summary

1. The shock therapies and the prefrontal lobotomy operations have led many to believe that destruction of brain tissue is necessary in the therapy of mental diseases.

2. Convulsive electrostimulation with pulsating direct current of one fifth the energy value of currents required in the Cerletti-Bini technique results in little if any evidence of brain damage yet produces therapeutic results which may be explained by an excitation and facilitation of inhibited brain network patterns.

3. A general theory regarding the nature of mental disease in terms of complex inhibitory patterns interfering with the integrative mechanisms of the normal dynamic stereotypy is presented.

REFERENCES

1 Sakel, M.: "The Pharmacological Shock Treatment of Schizophrenia," (Trans. by J. Wortis), *Nerv. and Ment. Dis. Pub. Co.*, New York, 1938.

2 Meduna, L.: "Die Konvulsionstherapie der Schizophrenie," *Carl Marhold*, Halle, A. S., 1937.

3 Carletti, U., and Bini, L.: "Un Nuovo Metodo di Shockterapia 'L'Ettroshock,'" *Boll. Accad. Med. Roma*, 64: 136-138, 1938.

4 Moniz, E.: "Les Possibilites de la Chirurgie dans le Traitement de Certaines Psychoses," *Lisboa Med.*, 13: 141-151, March 1936.

5 Freeman, W., and Watts, J. W.: "Psychosurgery," *C. C. Thomas*, Springfield, Illinois, and Baltimore, Maryland, 1942.

6 Tietz, E. B., Thompson, G. N., Van Harreveld, A., and Wiersma, C. A. G.: "Electronarcosis—a Therapy in Schizophrenia," *Am. J. Psychiat.*, 101: 821-823, May 1945.

7 Berkwitz, N. J.: "Faradic Shock Treatment of 'Functional' Psychoses; Preliminary Report," *Journal-Lancet* (Minn.), 95: 351-355, Aug. 1939.

8 Friedman, E., and Wilcox, P. H.: "Electrostimulated Convulsive Doses in Intact Humans by Means of Unidirectional Current," *J. Nerv. and Ment. Dis.*, 96: 56-63, July 1942.

9 Proctor, L. D., and Goodwin, J. E.: "Clinical and Electro-physiological Observations Following Electroshock," *Amer. J. Psychiat.*, 101: 797-800, May 1945.

10 Clearview, Evansville, Indiana.
Harding Sanitarium, Worthington, Ohio.
The Institute of Living, Hartford, Connecticut.
New Hampshire State Hospital, Concord, N. H.
North Shore Health Resort, Winnetka, Illinois.
Norwich State Hospital, Norwich, Connecticut.
Parkway Sanitarium, Chicago, Illinois.
Toronto Psychiatric Hospital, Toronto, Ont.

11 Liberson, W. T., and Wilcox, P. H.: "Electric Convulsive Therapy: Comparison of 'Brief Stimuli Technique' with Friedman-Wilcox-Reiter Technique," *Digest of Neurol. and Psychiat.*, 13: 292-302, May 1945.

12 Wilcox, P. H.: "The Electroshock Convulsion Syndrome," *Am. J. Psychiat.*, 100: 668-673, Mar. 1944.

13 Lowenbach, H., and Stainbrook, E. J.: "Observations on Mental Patients After Electroshock," *Am. J. Psychiat.*, 98: 828-833, May 1942.

14 Campbell, Jean: "A Working-out Program for State-Hospital Patients," *Mental Hygiene*, 29: 429-434, July 1945.

15 Pavlov, I. P.: "Conditioned Reflexes and Psychiatry," (Translated by W. H. Gantt), *International Pub.*, New York, 1941.

Pedagogical Group Psychotherapy*

J. W. KLAPMAN, M.D.*
Chicago, Illinois

Group psychotherapy came into existence more or less as a desperate expedient, but as so often happens, the makeshift proved to have virtues of its own. Actually, it is not a substitute for or an equivilent collateral to individual psychotherapy, but it utilizes a segment of the psychotherapeutic range minimally engaged by individual psychotherapy.

For the special attributes, indications, and advantages of group psychotherapy the reader must be referred elsewhere[1,2,3] as only the question of techniques is the subject of this paper.

Classification of Group Psychotherapy Techniques

Thomas[4] classified all procedures along an axis whose two poles were: (a) repressive-inspirational, and (b) analytic. To these two there could properly be added a third, namely, (c) median. According to Thomas all group psychotherapeutic procedures will find a place somewhere along this axis. Naturally, there is no pure form of either practice and both trends have much in common.

(a) Repressive-Inspirational Group Psychotherapy

By these techniques is meant a form of treatment in which the transference situation or, more specifically, the transference neurosis, is almost exclusively utilized. The authority of the central figure, the therapist, is supreme and all questions and doubts are settled by him in a more or less patriarchal manner. This is, in effect, a bolstering of repressions. It can only be assumed that patients with marked dependent needs will be attracted to this form of group psychotherapy. The therapy may be of a rather peremptory character, the enjoined adjustment and deportment of the patient depending on a rule of thumb, reinforced by the authority of the therapist. Additionally, much reliance is placed on the testimonials of improved patients through their ability to raise and maintain the morale of the others. Among the practices reminiscent of a religious revival, is the device of seating the patients in the order of the frequency of their attendance, those with the best attendance records occupying the "honor bench". After a period of practicing general relaxation, a text containing an inspirational message may be read, followed by a short address by the therapist.

At this pole of the group psychotherapy axis would be found such procedures as Coueism, Christian Science, mesmerism, and those of Alcoholics Anonymous.

(b) Analytic Forms of Group Psychotherapy

In these forms of the practice of group psychotherapy there are generally fewer patients. Schilder[5] would seldom have more than four or five in a group. Patients are encouraged to free association in class, ventilating some of the most intimate details of their histories. The patients are also seen individually for intensive psychoanalytic psychotherapy and the psychodynamics of the patient's disorder are more or less thoroughly investigated. In general, analytic methods tend to foster insight in the patient. Some of the leading exponents of these forms of group psychotherapy were Wender[6] and Schilder.

(c) Median Forms of Group Psychotherapy

Although not a distinct pole, the position of some practices mid-way point between the ends of the axis entitles them to a distinct classification. As suggested, median techniques of group psychotherapy make a combination of the qualities and procedures of both (a) and (b). Into this category would fit the practices of Pratt,[7] Rhoades,[8] Harris,[9] and Buck.[10]

Some General Considerations of Group Therapy Methods

Usually one of the most important procedures and possibly the backbone in the administration of group psychotherapy, is a series of lectures which deal with problems of emotional and mental hygiene. The lectures are in some measure the counterpart

*Institute for Juvenile Research.

of interpretations in individual psychotherapy. Most group therapists are also agreed that individual psychotherapy should be given in conjunction with group therapy.

It may be countered, then, that if the therapist must see the patient individually as well as collectively, much of the vaunted advantage of group psychotherapy has been nullified, for, instead of being able to treat more patients with a saving in his time, he now has to spend more time with the same number of patients. Against this objection it may be sufficient to state that the therapist may see each patient but once a week, or possibly less often, for a half hour or less instead of the customary two, three, or four hours weekly. The facilitation, the catalytic action, of group psychotherapy in resolving resistance and the speed in forming a good working relationship are some of its most important contributions. It not infrequently happens that a patient may appear untreatable, or he will discontinue treatment after one or two sessions in individual therapy. The difficulty lies often in the fact that the patient is unprepared for a psychotherapeutic approach which appears to him so different from other clinical procedures. Or, the patient has been the victim of much misinformation about psychiatrists, which is often by no means dispelled by the initial interviews. In a group a greater air of verisimilitude is created because other patients are seen and heard to accept the bases of therapy propounded by the therapist. Patients otherwise untreatable may, in the group, acquire an orientation to psychotherapy free from the suspicion of ulterior design with which it is often invested in the mind of the patient when he and the therapist are closeted in the privacy of the latter's office.

As to the lectures delivered by the therapist, it is evident that if they are to be comprehensive and informative and follow naturally in a systematic fashion, the therapist must make thorough preparation. Even this may not be a guarantee against failure, and certainly for those who are not gifted, fluent and adept lecturers, this procedure can prove disappointing. Stirring lectures can, of course, arouse much enthusiasm and generate conviction (usually emotionally surcharged), but under average conditions the audience or class remains passive listeners, being talked to or at. Again, the lecturer may wonder what important points or nuances he failed to include in his talk. How clearly and plainly has he delineated his thesis? How forcibly has he made his point?

There are also practical considerations in administering group psychotherapy in a clinic or hospital of any size. In such instances there may be a practical need for uniform application and possibly a need for some degree of standardization. At any clinic of considerable size, it will often happen that the therapist may be unavoidably absent, or a change in therapists may be necessary. The continuity of the class atmosphere in such instances may be threatened while the new therapist and patients readjust themselves. Such a period of readjustment would seem unavoidable in any case, but it would seem advisable to hold this difficulty down to an irreducible minimum.

Again, as Glover[11] has remarked, "In my view the advancement of psychotherapy requires the development of a psychotherapeutic technique demanding only the wisdom of an intelligent medical graduate and the morality of the Hyppocratic oath he takes on graduation."

Pedagogical Group Psychotherapy

To obviate some of the aforementioned difficulties, the writer has employed a mimeographed textbook around which the group therapy centered. By pedagogical therapy is meant a procedure in which recourse is had to a printed text, the therapy thus taking on the semblance of academic or classroom technique.

Because the text attempts a searching and exhaustive exposition of psychodynamics and because it encourages and fosters a degree of emotional catharsis and insight, pedagogical group psychotherapy may, with justice, be placed closer to the analytic pole in the group psychotherapeutic procedures than the median forms.

One need have little fear that the textbook would completely replace the therapist. A good textbook has never succeeded in eliminating the teacher, and conversely, the most gifted teachers have found good textbooks indispensable.

The objection may be raised that if group psychotherapy is to become so largely a function of teaching it will leave the affective components of psychotherapy relatively untouched. This cannot be a valid objection. Some therapy occurs on an infraverbal level and the phenomena associated with the transference are of such an order. However, much of the handling of the transference situation is mediated through the spoken or written word. In the main, language is the most important vehicle and mediator of therapy. It is a grave error to minimize the role of the intellect in psychotherapy for, as Alexander[12] has remarked, the intellect exerts an incessant pressure on the affect throughout the treatment, slowly enforcing its verdict. Needless to say, if one envisages the enlistment of the intellect as an ally in the treatment of the patient it thereby becomes incumbent on the therapist to attempt to enlarge and refine that intellect in order to utilize it to its optimum capacity. In a textbook the territories which the subject matter may include can be carefully mapped out and dilated upon as liberally as desired, consistent with the requirements and aims of group psychotherapy.

These aims and requirements should indicate the need for education even in the academic sense. As a preparation for intensive individual psychotherapy and even for psychoanalysis, the educational role of group psychotherapy even of the academic order may be seen in the importance of language and diction. What practical psychotherapy that is the least analytic in character can be carried on without the term and concept, "repression"? If the patient has not an adequate concept of the meaning of this term it is obvious that therapy is greatly impeded, and it is partly the lack of such and similar preparation that makes many patients unsuitable for intensive individual psychotherapy or psychoanalysis.

In any case, despite subject matter which at times may appear too involved for the average patient, it is significant to note how frequently "complex indicators" (to borrow a term) are uncovered concerning which patients will indicate a far deeper grasp than they might ordinarily be credited with. It is noteworthy that whenever the content of the text or discussion engages the affective capacity the bar of language and the turn of phraseology appear to be a minimal hindrance to understanding. This is no argument in favor of making the subject matter presented in the textbook as abstruse and recondite as possible, naturally, but it does cast doubt on the wisdom of a strenuous effort to write down to the supposed lower level of the patient's comprehension. It would seem more logical and therapeutic to attempt to raise the level of comprehension as high as possible. Moreover the therapist is there to explain, interpret, simplify, and amplify.

The procedure in pedagogical group psychotherapy is for each patient, in turn, to read a passage of the book aloud. He then recapitulates what he has read, comments on it, and perhaps asks questions about it. Other patients may join the discussion and likewise comment on the points evolved. The material may set off a train of recollections in some patients which may be emotionally highly charged and to which the patient will abreact, or the discussion may lead into long digressions in which the therapist or another patient may dilate upon the material at some length. So long as the therapist believes the tangential material bears the remotest relationship to the work of the class he will continue with it. Such digressions may frequently suggest assignments, such as reports and book reviews by patients, or the material may suggest subjects for symposia and debates.

The patient is never held strictly to account for what he has read. If he appears unable to summarize a passage, the therapist will prompt and assist him or another patient make a helpful comment on the passage.

There is no necessity, as in the schoolroom, to cover any given amount of material in a unit of time. If only one sentence has been read which by its digressions and comments has elicited much discussion, airing of views and attitudes, abreactions, etc., the period must be counted as a profitable one. The therapist, meanwhile, has had a good opportunity to observe and note reactions. The textbook may always be referred to. At the same time, pedagogical group psychotherapy does not exclude other modes of procedure. All the other variants are there to try as

indicated; i.e. psychodrama, field trips, music-therapy, bibliotherapy, etc.

An additional advantage is that the patient can have access to the material at any time to study and "work through" outside of the class period. Frequently patients have approached the writer to ask for the loan of a book to study or to catch up with the class.

Has not pedagogical group therapy descended to nothing more than the business of pedagogy, and the group therapist thereby become indistinguishable from the pedagogue? No, there is still considerable difference.

It is well known that a gifted teacher possesses something more than a knowledge of his subject; that he possesses certain qualities which make the material he presents effective. It may be conceded that a good teacher is by that virtue already partly a psychotherapist, and conversely, the good psychotherapist is something of a good pedagogue. Undoubtedly there is an area here in which some overlapping of skills and qualities does exist.

The group therapist will not be primarily concerned with the amount of knowledge acquired by the patient, nor how expeditiously it was acquired. Rather, he is acutely sensitive to the reactions of his patients in class and is attuned to the slightest nuances of speech and deportment, while, at the same time, he is respectful of knowledge in itself, in its effects in broadening intellectual horizons and in placing intellectual tools at the disposal of his patients.

The functions of the textual material in its direct relation to psychotherapy will be seen in its capacity to act as a resonator setting off the patient's own emotionally-charged memories and cogitations. In the individual interview patients will often say, "... like it said in the book," or, "You know, after reading that incident in the book of the man who ... I had a dream in which, etc."

One of the most impressive uses to which group psychotherapy lends itself is that of teaching the art of psychotherapy itself, the teaching of medical students, nurses, and other workers in allied fields. Usually the student must glean his knowledge from books and didactic lectures, but for practical demonstration there are relatively few means. Group psychotherapy enables the student to sit right in class and even to become a participant. The fact that the therapy may, to a considerable extent, be mediated through a textbook will prove no hindrance and possibly an advantage. The student may thus gradually be inducted into the practice of psychotherapy in general.

Summary and Conclusions

1. In pedagogical group psychotherapy an attempt has been made at a more systematic and simplified approach to group psychotherapy.

2. It permits a measure of standardization and a basis of comparison.

3. Not depending on the forensic skill of the therapist it maps out more thoroughly the educational and re-educational territories, thus enlarging intellect, supporting the ego, and providing a greater number of psychic "resonators".

4. It does not exclude the employment of any other group psychotherapy technique useful in conjunction with it.

185 N. Wabash Avenue.

REFERENCES

1 Klapman, J. W.: "Group Psychotherapy; Theory and Practice," *Grune & Stratton*, New York, 1946.
2 Slavson, S. R.: "An Introduction to Group Therapy," *Commonwealth Fund*, New York, 1943.
3 Lazell, E. W.: "The Group Psychic Treatment of Dementia Praecox by Lectures in Mental Re-education," *U. S. Vet. Bur. Med. Bull.*, 6: 733-47, 1930.
4 Thomas, G. W.: "Group Psychotherapy; A Review of the Present Literature," *Psychosomatic Med.*, 5: 166-80, 1943.
5 Schilder, P.: "Psychotherapy," *W. W. Norton*, New York. 1938.
6 Wender, L.: "Dynamics of Group Psychotherapy," *J. Nerv. & Ment. Dis.*, 84: 54-60, 1936.
7 Pratt, J. H.: "The Influence of Emotions in the Causation and Cure of Psychoneurosis," *Internat. Clin.*, 4: 1-16, 1934.
8 Rhoades, W.: "Group Training in Thought Control for Relieving Nervous Disorder," *Ment. Hyg.*, 19: 373-86.
9 Harris, H. T.: "Efficient Psychotherapy for the Large Out-Patient Clinic," *New England J. Med.*, 221: 1-5, 1930.
10 Buck, R. W.: "Class Method in Treatment of Essential Hypertension," *Ann. Int. Med.*, 11: 511-18, 1937.
11 Glover, E.: "Lectures on Technique in Psychoanalysis," *Internat. J. Psychoanalysis*, 8: 311-38, and 486-520, 1927; 9: 7-46 and 181-218, 1928.
12 Alexander, F.: "The Voice of the Intellect is Soft," *Psychoanalyt. Rev.*, 28: 12-29, 1941.

Hydrocephalus: Classification and Diagnosis

JAMES GREENWOOD, JR., M.D.
Houston, Texas

Hydrocephalus is a condition arising from various causes. A true hydrocephalus results in dilatation of the ventricular system and is therefore "internal," although accidental escape of fluid into the subdural space occasionally causes a true external hydrocephalus. All hydrocephalus is obstructive since there is always blocking either in the ventricular system or in the subarachnoid spaces. For purposes of differentiation, subarachnoid obstruction has been designated as non-obstructive since the ventricles communicate with the spinal subarachnoid space. There is no evidence that an excess secretion of cerebrospinal fluid can cause hydrocephalus. The results of removal of the choroid plexuses have proved that some fluid is secreted by them, although, perhaps, not all of the fluid is from this source, for in cases where the absorbing power is low, only partial alleviation of symptoms is obtained. Also in cases of meningitis followed by hydrocephalus, the plexuses are often completely destroyed, yet the enlargement of the head continues.

The perfect results of surgery in a few apparently hopeless cases, and similar results in some cases by more simple methods such as repeated ventricular taps, make it imperative that early diagnosis be made not only of the hydrocephalus but its etiology and type as well. I still share the hopeless feeling of all physicians in regard to the child born with an enlarged head. In the child who is born with a normal head whose hydrocephalus begins at birth or shortly afterward, much can be done to stop the process before permanent damage is done to the brain. I am ready to admit that any method of treatment is useless unless the mentality of the child as well as life is preserved.

Classification

I. *Communicating Hydrocephalus:* (Ventricles communicate with the spinal subarachnoid space. Block in the basal cisterns or cerebral subarachnoid spaces.)
  A. Adhesive arachnoiditis.
    a. Following subarachnoid hemorrhage from trauma or hemorrhagic disease.
    b. Following acute meningitis.
      Meningococcic, penumococcic, etc.
    c. Chronic meningitis.
      Tuberculosis, syphilis, coccididiodal granuloma, etc.

II. *Non-communicating Hydrocephalus.*
  (Block in the ventricular system.)
  A. Obstruction of the Aqueduct of Sylvius.
    a. Congenital.
    b. Glial proliferation.
    c. Inflammatory.
  B. Obstruction of Foramina of Luschka and Magendie.
    a. Congenital.
    b. Inflammatory.
  C. Arnold-Chiari malformation with or without spina bifida.

III. *Conditions Simulating Hydrocephalus*
  (may cause enlargement of the skull, separation of the sutures, etc.)
  A. Brain tumor.
  B. Subdural hematoma.
  C. Hemorrhage (subarachnoid and intraventricular. This may be a part of hemorrhagic disease).
  D. Lead poisoning.
  E. Meningitis.
  F. Lateral sinus thrombosis (not infected).

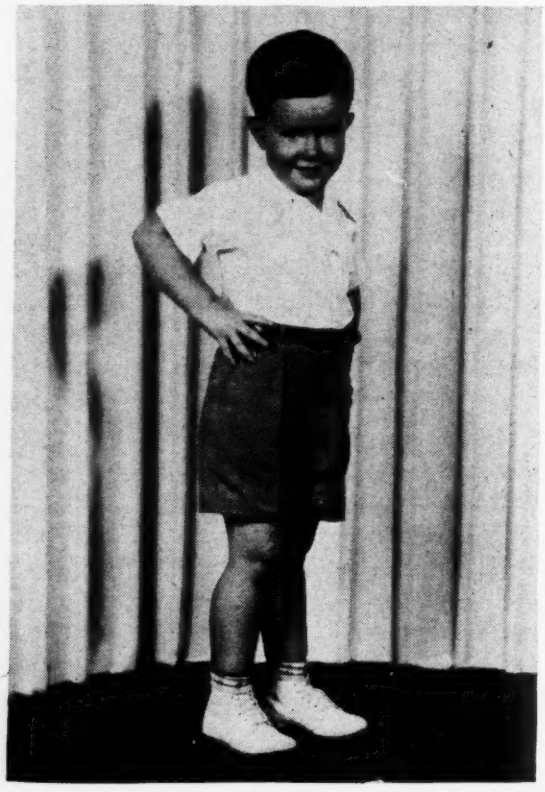
Signs and Symptoms

In a small percentage of cases hydrocephalus is evident at birth and, as a rule, there is little that can be accomplished for this group. More frequently, however, the condition begins to develop shortly after birth and the etiology usually is due to one of the above mechanisms. Early diagnosis is imperative and should include the exact classification if possible. Vomiting, lethargy, inability to take feedings properly, and a tendency to hold the head well back may be noted in the early stages. Tension of the fontanelle is best checked by observing in the erect position the absence of normal depression and pulsation. This must be done while the child is neither straining nor crying. Enlargement of the fontanelle and separation of the sutures are late signs, and the so-called "cracked pot" percussion sound is present only after the

brain has been thinned out to less than one-quarter of an inch. Nystagmus, generalized spasticity, optic atrophy, and ocular palsies also occur late. A frequent check of the circumference of the head and a comparison of this with the chest size will give an indication of the degree of decompensation. In our series, the average rate of increase varied between three-fourths and two inches a month.

The type of hydrocephalus can usually be determined by ventricular and spinal punctures, combined with aspiration of the subdural space and ventriculography in some cases for differential diagnosis. The procedure which we carry out routinely is as follows:

The right lateral fontanelle angle is shaved for an area of about two inches in diameter and, after injection of novocaine, a two-inch spinal needle with syringe attached is introduced into the subdural space (just under the skin). If nothing can be aspirated, the needle is carried into the ventricle and fluid aspirated. About 25 cc. of fluid is withdrawn and 25 cc. of air injected. Then 1 cc. of PSP dye is injected and thoroughly mixed with the ventricular fluid by repeated aspiration and injection. The needle is then slowly withdrawn to the point where fluid can no longer be aspirated (needle point at ventricular wall), and a hemostat is placed on the needle at the skin level. After the needle is withdrawn the length of the part which extends beyond the hemostat will give the approximate thickness of the cortex. Spinal puncture is then done and 5 to 10 cc. of fluid are withdrawn. This fluid will have a pinkish color if the ventricles communicate with the spinal subarachnoid space. X-rays are taken, usually upright lateral and P-A views, for purposes of obtaining the actual cortical thickness. The spinal fluid is examined for blood, cell count, organisms, Wassermann, colloidal gold, and total protein. The urine is tested for PSP at each voiding with 10th N sodium hydroxide until the color is no longer visible.



This child is now 6 years old and is perfectly normal and is attending school. The circumference of his head at six months was 18¾ inches. A right plexectomy was done at eight months; left plexectomy was necessary sixteen months later.

Much information is obtained by this simple procedure and subsequent treatment depends upon the findings.

1. The presence of blood in the ventricular fluid is a fairly frequent finding and its removal by repeated taps may allow cerebrospinal fluid hydrodynamics to return to normal. Some infants, however, will develop an adhesive arachnoiditis and hydrocephalus after the hemorrhage has cleared up entirely. This is particularly true in prematurity.

2. The presence of meningeal irritation or meningitis (cell count) would indicate the need for the usual chemotherapeutic methods (a low-grade meningitis in infants, particularly premature ones, may not produce a significant temperature). With survival, the resultant adhesive arachnoiditis may or may not be severe enough to cause a progressive hydrocephalus. In our experience, this group gives the poorest result with surgery.

3. Determination of the type of hydrocephalus, communicating or non-communicating, would determine the type of surgery, if this is to be done.

4. The PSP test gives a fairly good estimate of the degree of impairment of the fluid absorbing mechanism. As a rule, if the dye persists in the urine longer than two and a half to three days, plexectomy cannot be expected to reduce the fluid formation sufficiently to be effective.

5. The thickness of the cerebral cortex as determined by needle measurement and by x-ray after injection of a small amount of air is important. Although the hydrocephalus may be controlled, no high mentality can be expected if the brain is not at least three-eighths to one-half inch in thickness.

Summary and Conclusions

Only by early diagnosis and careful study as to the type and cause of hydrocephalus can we hope to accomplish anything with this condition. The diagnosis can and should be made before there is much enlargement of the fontanelle and separation of the sutures, and before the brain is badly damaged. A procedure has been given for determining the type and degree of hydrocephalus. With this as a guide, frequently we can direct our efforts toward the cause by removal of intraventricular blood or treatment of infection. After a permanent block has occurred in the ventricular system or absorbing mechanism, only surgery can be of assistance. So far, third ventriculostomy or plexectomy are the two most successful procedures and, although both leave much to be desired, a number of good results have been obtained.

The Genesis of Combat Fatigue

E. W. COCHRAN, M.D.*
Galveston, Texas

Much has been written on the subject of combat fatigue in an effort on the part of authors to add their observations to the common pool of knowledge. In this paper a study limited to a small group of marines engaged in a single campaign is presented. We aim, thereby, to bring into close focus the actual genesis of combat fatigue. This same picture, or a similar one, has been duplicated countless times upon innumerable fields of battle.

It was just another drudgerous step in the island-to-island progression of the Pacific War when marines of the Third Division climbed ashore on the beaches of Bougainville at daybreak on November 1, 1943. These men had trained long and patiently for this, their first combat operation after nine months overseas. There had been many false starts, each followed by a further period of waiting. What the over-all plan had been, we do not know, nor is it important. The fact remains that the "little man," with whom we are primarily concerned, had been "keyed up" for all these months awaiting this occasion. From the day he had bade farewell to his homeland and all that it meant, as a minute functional unit in a huge military machine, he had, of necessity, identified himself as a small cog in a great machine which was ever ready to turn when the operator saw fit to press the button.

This individual and thousands like him had now embarked upon a new experience unlike any they had ever known. The months of rigorous training and preparation, the waiting and suspense were not without effect on the troops. As D-day approached tension mounted and various reactions were observed. In most instances this was what the men had been waiting for; they had become weary and bored of the continuous maneuvers and drills to which they had been subjected during the preceding nine months; this was what they had come overseas for at last, they had an opportunity to do something. On the other hand, there were those who, during this time, had been doing much thinking; they had talked to veterans of Guadalcanal and New Georgia and had heard the gory details of what it was like "up front"; this had not set too well with their ideas of self-preservation and they were not so sure that they wanted to become heroes. Then there were those exceptional cases where the reaction was that of indifference. But, ready or not, the time had come and they were all in the same Higgins Boat together.

The mission was to secure a beachhead on Cape Torokina large enough to accommodate one or more bomber strips and to establish

*Lt. Comdr., M.C., U.S.N.R. (Inactive Status).

a perimeter defense to hold this sector. The initial beachhead was established against moderate opposition, and after two months of "blood, sweat, and tears," the final objective was achieved. It is not our intention to attempt a detailed description of the campaign, but rather, to point out such experiences as may enable us to identify some of the factors which may precipitate that acute emotional state in combat troops which we have come to call combat fatigue.

From the moment of our arrival to the day of our departure, the Bougainville jungle was a constant threat. It was the enemy's best friend, because he knew it well and was able to utilize it to good advantage both for offensive and for defensive measures. Our men had been informed of this fact, and this knowledge served only to magnify the mystery of the jungle, particularly at night. All front line troops retired to their fox holes at 1900 (7 P.M.) and remained there until 0700 (7 A.M.). Any movement outside the fox holes between these hours was challenged, and if immediate recognition was not established, the intruder was usually fired upon. Sometimes the culprit was a frog or some predatory animal; less frequently it was actually the enemy; but too often it proved to be one of our own men. The men were warned repeatedly against being "trigger happy," but as long as tense, nervous fingers found such easy access to the light trigger of an M-1 rifle, the story was invariably the same. Although on previous training maneuvers these troops had been indocrinated in night jungle noises, the terrain in which they had been trained had never actually presented any threat to their welfare. That made a great difference. Now they heard mysterious sounds which they had never known. To make matters worse, the enemy was well aware of this weakness and aggravated it whenever and wherever he was able to. Consequently, many sleepless nights were spent on the front lines, even in the absence of bombardment.

Besides the dense jungle, this terrain presented another unwelcome feature—swampland, and plenty of it. On an operations chart in some rear area, each combat team could be moved into its respective sector so that it all made a very pretty picture. But up on the line, where the move had to be executed, the picture was quite different. Frequently it seemed that the line would run through the most undesirable terrain that could be located in that sector. During the first two weeks of the campaign the rumor persisted that we had taken something which we could not use. The word spread that it would be impossible to construct any sort of airstrips on Cape Torokina; anyone could simply observe the swampy, jungle-covered terrain about him and see for himself; our Intelligence had really slipped up this time; all of our long months of preparation and waiting, our fighting and our casualities had gone for naught; the campaign was a failure. It is not difficult to conceive what such poisonous "scuttlebutt" did for the morale during those first two weeks.

Besides furnishing the basis for these demoralizing rumors, the swamp did not favor living conditions. To make it somewhat livable, each marine had his machette, entrenching tool, and poncho. Usually a patch of "high" ground, deep enough to allow for a fox hole, could be located; but upon many occasions it was necessary to line up enough logs and brush to furnish some sort of place upon which to sleep. Even after we had advanced far enough inland to get out of the swamp, in order that we may not become too complacent about living conditions, Bougainville kept her rains going. This stimulus brought out the latent architectural abilities in every individual. However, banana leaves, stalks and vines could not always be depended upon and during the night our fox holes often became "bath tubs," in which we were compelled, by security measures, to remain until daybreak.

In spite of these living conditions, it was not infrequent that we heard the remark, "Things wouldn't seem so bad up here if they would only get some chow up to me." And this statement contained a lot of truth. Even in a rear area the marine's bill of fare is notoriously poor. And the nearer he gets to the front lines, the less he can expect. No system has yet been devised whereby good food can be made available to the front line troops. It is true that excellent strides have been made to improve the situation, but throughout the Solomon Islands Campaign no improvement was seen. Of the fifty-seven

days we participated in the Bougainville Campaign, our unit was on the front perimeter fifty-five. During the entire period we tasted fresh meat twice, in the form of turkey stew for which we had to trudge nearly a mile through rain and mud. The two occasions were Thanksgiving and Christmas. For a total of about twelve days, at irregular intervals we had some form of hot meals, consisting primarily of corned beef or hash and hardtack. The remainder of the time we subsisted on C, K, and D rations. No provisions were made for heating these rations. Two tubes of heat tablets had been issued each man prior to debarkation, but these lasted only two days, at best. Nothing on Bougainville would burn because of the dampness, but after considerable research it was found that gasoline, gun oil, mosquito repellent, discarded D and K ration cartons, and even medical alcohol served the purpose. The C and K rations gave the men diarrhea and the D rations constipated them; and rarely was a satisfactory physiological balance between the two established. Many of the men had difficulty in digesting these rations after the first two or three weeks, and preferred to eat cocoanuts or captured Japanese rice. It became increasingly difficult to keep the troops from slipping away from the front lines in an effort to go back to some C. B. camp or rear supply dump in search of food. We had weighed each man in the battalion before embarking on this operation. Upon return to our rear base immediately after the operation, we weighed them again. The average weight loss per individual was slightly over fifteen pounds.

Another factor which played an exceedingly significant role, though it was by no means unique to this campaign, was that of leadership. That a close correlation exists between poor leadership and the incidence of acute emotional disturbances in any given military organization is a fact which cannot be denied. In a marine division this factor enters into play from the division commander down to the squad leader. The smaller the unit the more prominent it becomes. A leader may be incompetent, or being competent, may give the impression of incompetency to the members of his group. The important point is not the actual ability of the leader, but the subordinate's estimate of his ability. And this estimate may be based on any number of factors arising from the inter-relationship between the leader and the group.

There was a company commander in our group who was notorious for the almost impossible regulations he laid down for his men. It was his practice to punish any offender by ordering him to dig a fox hole a few yards in front of the line, and to remain there, subsisting on nothing but cold C rations for a prescribed number of days. Among the men of his command there was rebellion, loss of respect, and loss of confidence. Though his company did not see as much action as the other companies of our battalion, it accounted for almost half of our N. P. casualities. On the other hand, there was one platoon led by an Alabaman, about six feet four inches tall, and weighing about two hundred fifty pounds, which was engaged in more action than any other in the battalion. While the casualty list was the longest, the number of N. P. casualties from this unit was the least. It was not infrequent to hear one of his men remark, "I'd follow that guy to hell and back!" The tabulation of our casualties showed vividly the result of this difference in leadership.

In the foregoing discussion we have sought to present the factors which operated insidiously from the onset of the campaign to lower the individual's threshold of resistance to the merciless bombardment of painful stimuli, to which he was continuously subjected. Add to this picture the more dramatic actual battle experiences, which the patient believes is responsible for any unusual behavior, but which we may more practically consider as simply the "straws that broke the camel's back." It is interesting that during the first twenty-five days of the operation we recorded only one mild hysterical reaction, which was brought under control within a few hours, and the patient was returned to the line where he remained to give a satisfactory performance. However, during these first weeks we were subjected to persistent air and artillery bombardment, as well as frequent line skirmishes.

On the twenty-fifth day we evacuated our first casualties labeled as combat fatigue. On that day our battalion engaged the enemy in a close pitched battle, involving much grenad-

ing and some hand-to-hand combat. There were many casualties. The wear and tear of the past weeks began to show its effect on the men. Their thinking became more and more influenced by their weariness of the whole messy situation. But no end was yet in sight. One day our unit would be ordered to "dig in" and fortify its positions, as this was to be the final perimeter. The next day the order would come to move forward immediately, to another objective. This procedure continued for about two weeks. Finally, we did reach our ultimate objective—the summit of Hill One Thousand, so named because of its elevation. We occupied this position until we were relieved by the army, sixteen days later.

The enemy occupied well-fortified positions on the summit of another hill directly in front of us. Our artillery units in bombarding these enemy positions, would clear the summit of our hill by only fifty feet. Heavy barrages were laid down day and night. The shriek of the shells passing so closely overhead, day after day, was bad enough, but many fell short. The infantryman does not realize that the artilleryman expects a certain percentage of "shorts" in every barrage. Even if he should be aware of this fact, the actual fulfillment is always tragic. When shells fall short, the infantryman thinks that the artillery has gone "haywire" and his anxiety frequently becomes uncontrollable. This was our experience, and our casualties continued to mount —mental as well as physical. During this same period another incident occurred which added insult to injury. One of our TBF's, in an attempt to bomb the enemy positions on the opposite hill, mistaking our hill for the objective, came in strafing, releasing six one-hundred-pound bombs, which landed squarely in our battalion headquarters, killing two, and wounding twelve.

The general condition of the troops was such that it became simply a question of who was going to "break" next. The incidence of acute anxiety reactions increased with each new battle experience. While the clinical picture in each case differed to a certain degree with the individual, the essential features were usually the same. Overwhelming fatigue was truly the outstanding characteristic; the patient had finally reached "the end of his rope"; he just could not "take it" any longer. A common request was, "Doc, I'll do anything if you'll just get me out of here." Most of the patients were talkative and eager to unburden their conflicts on a sympathetic listener, doing so with a great play of emotion, as though this turmoil within them had been crying for expression for a number of days. There was a characteristic tendency to exaggerate their experiences, possibly an effort to rationalize their behavior. But whatever the mechanism, these individuals appeared to believe, wholeheartedly, the stories they told. A bandsman, who had been acting as litter bearer, was brought to the aid station in an acute anxiety state. He found many sympathetic listeners, as, through a veil of tears he vividly described his harrowing experience. Under intense enemy fire, he was attempting to place a wounded marine on a litter, when an enemy grenade landed so closely that it blew the marine's head completely away. When we tabulated our casualties at the end of the skirmish that day, and all were accounted for, we found no case of decapitation, in fact, not even a head injury.

On another occasion, a pharmacist's mate, in an acute emotional state told of how, in the midst of an enemy bombardment, he had seen a piece of shrapnel strike a marine in the chest. He gave the marine's name and told us where we could find him, although he thought that there would be little need for first aid, as the marine's lung was hanging out when he had last seen him. Upon the arrival of a litter team at the scene, they found this marine intact and unscratched. Furthermore, we had no cases of chest injury that day. Profuse and prolonged weeping was often a part of the picture. It was not uncommon to see a tough-looking, bearded marine slumped down beside a cocoanut tree, with his head between his hands, crying like a baby. Apathy was rarely seen, and we recall only one instance of classical hysterical stupor.

The majority of these patients were evacuated from the battalion aid station as rapidly as conditions permitted. Only patients showing the mildest subclinical manifestations were ever retained for further duty. The presence of an individual on the front line, who is suffering an acute emotional episode,

is like the bad apple in a barrel. If allowed to remain, he will soon infest the others. Also the nightmares and sleepwalking, which so frequently accompany these episodes, are "bad business," where cover and concealment must be rigidly enforced to safeguard against infiltrating enemy troops. Since our litters were vitally needed for evacuation of the wounded, and rapid disposal of all patients was a matter of necessity, we administered sedation only when it was required as a restraining measure, and this was rare. We were able to keep most of these patients occupied on their trip back to the medical company by giving them some simple task to perform, such as helping carry a litter, or taking a note to someone in the medical company. Whatever the task, we endeavored to impress upon the patient the fact that it was extremely important and that he was rendering a great service. On the basis of the number of individuals who were brought under control by this simple procedure, we are convinced that it was a worthwhile practice.

It was most interesting to note that of all the individuals suffering acute emotional disturbances, not one bore even the slightest physical wound. And those suffering actual battle wounds gave no manifestation of acute emotional symptoms. It, therefore, seems reasonable to assume that the preoccupation afforded by actual injury to the body served as a sort of buffer, which for the time being, at least, protected the patient from the pitfalls of hyperemotional behavior. It gave him something tangible upon which to focus his self-concern, an asset, if we may call it such, that the mental patient did not have. Also, his debility was in keeping with his soldierly ideals, was acceptable to the herd, and he suffered no feeling of guilt for his incapacity. The victim of an acute anxiety state, on the other hand, had succumbed to the overwhelming drive of self-preservation; his behavior was not in keeping with his soldierly ideals, nor was it acceptable to the herd. The patient was usually aware of these facts, in some measure, but was powerless to do anything about the situation. Consequently, a feeling of guilt was usually present, and in many instances, was even voiced.

Combat fatigue is the diagnosis with which these patients were evacuated. And in view of the prolonged physical strain, deprivation, exposure, irregular habits of living, and constant emotional tension to which these men were subjected, we believe that such a diagnosis was wholly justifiable. Because these individuals were able to make a satisfactory adaptation to the demands of military service, give satisfactory performance throughout a rigorous nine month overseas training program, and stick through weeks of combat, the significance of any pre-existing psychological mechanisms through which the clinical symptoms developed, must be minimized. Complete analysis of a number of such cases would undoubtedly reveal certain fundamental psychological mechanisms through which the symptoms were produced. It is our belief, however, that any such mechanisms as exist are common to a great majority of men, that their eradication is impossible and that, therefore, their importance in the prevention and treatment of these conditions be discounted.

It is not our purpose at this time to enter into a discussion of the prognosis and treatment of combat fatigue. We have sought only to present the clinical picture and the most important contributing factors from an eyewitness point of view. But in closing, we do wish to emphasize that the eventual outcome in the cases of these individuals will depend to a great degree upon the wisdom and understanding with which they are handled, and upon the orientation they receive before they are sent back to take their place in society—either civil or military. And this understanding can be reached only through a thorough working knowledge of the nature of this condition and of the factors which brought it about.

Neurological Clinical Pathological Conference

of the

Cincinnati General Hospital

CHARLES D. ARING, M.D., *Editor*

Case No. 114115

Presentation

A 70 year old white man was admitted to the Neurological Service on April 20, 1943. He had been seen regularly in the Out Patient Dispensary for the previous four years because of frequent anginal attacks on exertion which began about 1938. Nitroglycerin, phenobarbital, and aminophylline were prescribed as necessary. During 1940 the anginal pain occurred as frequently as three or four times daily; it was relieved by rest or nitroglycerin, after lasting a few minutes. Dyspnea and ankle edema developed transiently in June 1942 but he was able to get about. His blood pressure ranged around 240/110 throughout his clinic course, with the exception that for about a month during 1939 when it remained around 170/80.

He had had to urinate about three times nightly since December 1942. In January 1943 he began to experience difficulty in starting urination and by April 20, 1943 he had developed complete retention of urine.

There had been a modicum of dizziness associated with pain beneath the sternum and in the arms, which characterized the anginal attacks. On April 12, 1943 he had had one of his typical episodes of angina, in fact it was shorter than usual; however, it was followed by considerable weakness in the left extremities, at first more in the lower than in the upper. On April 20 the weakness in the left upper extremity became the more marked.

Abnormal signs on the admission examination were generalized arteriosclerosis, the left great toe had been crushed and amputated at the age of 17 years, mild left lower facial weakness, slight weakness of the left lower extremity, moderate weakness of the left upper extremity, and reduced deep reflexes on the left. A retention catheter was installed and the distended bladder decompressed at the rate of 200 cc. per hour. He required catheterization throughout his hospital course.

By April 22 there had developed a complete left, flaccid hemiplegia which included the lower portion of the left side of the face, and there was complete ptosis of the right upper eyelid. The right forehead was maintained in contraction. The only movement possible of the right eye was that slightly toward the right. The left eye could not be rotated upward; otherwise it moved through moderate ranges. All movements of the eyes were accompanied by nystagmus. The pupils were 3 mm. in diameter, they reacted normally. He blinked infrequently. Pinprick was better perceived in the right extremities and face than on the left. There was no response of the four remaining toes of the left foot to noxious plantar stimulation; on the right the plantar response was flexor. Some edema of the left leg was noted.

He became drowsy on April 25, and defects were noted in his memory. He was disoriented as to place and time.

On April 30 with good cooperation additional abnormal signs were elicited. The voice was hoarse and weak and there was dysarthria, he swallowed water with considerable difficulty, the left hand and fingers were edematous, and the deep reflexes were equally active. Plantar stimulation resulted in mild fanning on the left but not on the right. There was a weak left Hoffmann.

On the morning of May 1 he rapidly became deeply comatose with snoring respirations. Profuse sweating was observed over the left side of the face and neck, and in the left upper extremity and well down on the left side of the chest. The temperature and pulse rose rapidly to 105.2° and 120 respectively, and he died after having been in coma for eleven hours on the twelfth hospital day.

Laboratory Data: Vital signs were normal until April 26, except for an occasional pulse rate of 60; thereafter until the coma the temperature ranged around 102° F., the pulse around 90, and the respirations around 35. The blood pressure remained around 210/140. The

urine contained albumin. The red blood count was 3.56 million, the hemoglobin was 12 grams, the white blood count rose to 15,000 with 93 per cent neutrophils on April 28. On April 23 phenosulphothalein excretion amounted to 23 per cent at the end of four hours.

EKGs in 1939 and 1942 had shown left axis deviation, inverted T waves in leads 1 and 2, and a P-R interval of .24 to .26 seconds. Blood chemistry determinations were 4/23 urea nitrogen 44 mg.%; 4/28 urea nitrogen 72 mg.% and CO_2 C.P. 33 vols.%; 4/30 urea nitrogen 70 mg.%, CO_2 C.P. 34 vols.%. Blood Kahn was negative. A spinal puncture revealed an initial pressure of 80 mm. of water, the CSF resembled water and contained no cells, 46 mg.% protein, and 745 mg.% chloride. The CSF Wassermann was negative and the gold curve normal.

Differential Diagnosis

Dr. John Romano: This is the story of a 70 year old white man, admitted to the Neurological Service because he had experienced a slowly progressive left hemiplegia in the eight days before admission. Following admission, he became confused, his voice became hoarse and weak, and he experienced difficulty in swallowing. Eventually with evidences of nitrogen retention and fever, he lapsed into coma and died on his twelfth hospital day. His past history indicated that he had angina for four years previous to his death. This was probably due to or associated with arteriosclerotic heart disease.

The onset, course, and development of this man's illness lead one to believe that the patient had some type of vascular disease of the brain. There is no evidence to lead one to consider cerebral hemorrhage in the traditional sense, nor is there any evidence of the existence of embolic phenomena. The question arises as to whether or not we are dealing with hypertensive cardiovascular disease with the development of local cerebral softening or whether or not we are dealing with a more atypical type of vascular disease. Another possibility might be metastatic carcinoma; there was no evidence of a primary site of neoplasm, nor would we be able to explain clearly the more or less sudden onset on this basis.

The second question that arises is that of localization. Essentially his neurological findings were those of an alternating hemiplegia with involvement of cranial nerves on the right and hemiplegia on the left. In this instance there was involvement of the third and fourth nerves on the right and hemiplegia on the left, Weber's syndrome. When there is involvement of the red nucleus and the production of tremor instead of hemiplegia, it is called Benedikt's syndrome. Usually these syndromes are due to some type of vascular disease. However, they have been produced by expanding lesions of the peduncular region (cysts, neoplasms, etc.). One need not have complete paralysis of the third nerve in Weber's syndrome; it was so in this instance. There was no change in the size of the pupils, and their reaction to light was normal. There appeared to be involvement of the fourth nerve as the patient was not able to look down and out. It is quite likely, then, that we are dealing here with a peripheral disorder of the third and fourth nerves rather than central involvement, which may have destroyed more of the third nerve. In any instance, we are dealing with a partial lesion of the oculomotor nerve.

The left eye functioned normally except for upward gaze, which brings up two questions. We know that the involvement of the quadrigeminal plate causes paralysis of upward gaze. It would be rather difficult to implicate this structure in this instance. However, some of the fibers of the oculomotor nerve are crossed. Furthermore, the fibers which are crossed serve the inferior oblique muscle which raises the eye upward and outward. It may be then that a disturbance of the oculomotor nerve of the right side affected some of the fibers which go to the inferior oblique muscle of the left eye.

The left hemiplegia was due to injury to the right peduncle; in this instance it may have been that the leg area was involved primarily, the arm area later. It appears unlikely that the red nucleus was involved since there was no tremor. The disturbance of sensation was probably due to involvement of the medial lemniscus. Whether his lack of appreciation of pain was due to diminution of consciousness or to specific involvement of pain tracts, I cannot say.

His weak and hoarse voice leads one to

consider two possibilities: (1) as may relate to specific involvement of the nucleus ambiguus, which I would think unlikely; (2) or to bilateral supranuclear involvement of the fronto-pontine tracts, resulting in supranuclear (pseudobulbar) palsy.

The note indicates that there was profuse sweating of the upper third of the left side of the body. May I ask whether the patient did not sweat at all on the right side of the body, or was it that the sweating was more marked on the left side?

Dr. Charles D. Aring: The sweating on the left was profuse, there was very little sweating on the right.

Dr. Romano: It has been demonstrated[1] that contralateral sweating may be obtained by stimulation of certain cortico-pontine fibers. Whether we are dealing with this mechanism in this instance or whether we are dealing with ipsilateral inhibition of sweating due to right-sided involvement, I cannot say.

Neither am I able to explain in any detail the bladder disturbance. I do have the feeling that we may be dealing here with bilateral supranuclear involvement, in which case both the speech and bladder disturbances could be explained readily.

Finally, my diagnostic impression is that this man suffered from extensive and diffuse vascular disease. It is most likely that the small arteries were involved. These appear to have been diseased in the brain, in the heart, and in the kidney. He may have had a thrombosis of a branch of the basilar artery. The most likely localization, in my opinion, is that of the mesencephalon. There appears to be selective involvement of the third and fourth nerves on the right, with left hemiplegia. This would place the lesion near the exit of the third nerve in the midbrain adjacent to the peduncle. I have attempted to explain the dysfunction of the left eye, and I believe that the speech and bladder disturbances may better be explained on the basis of bilateral supranuclear lesions.

Dr. Milton Rosenbaum: One point that bothered me, does softening in the brain stem usually take so long to develop? This hemiplegia took days to develop. We expect signs to occur very rapidly in the classical thrombosis. To my mind this case does not fit the usual picture of hemorrhage or thrombosis. One wonders if there is any other type of peculiar vascular disorder operating here.

Dr. Romano: I do not know how to answer that. There undoubtedly was progression. It is not unusual for a person who has cerebral thrombosis to experience weakness and then to have it increase. Whether we are dealing here with an atypical variety of vascular disease, I do not know.

Dr. George L. Engel: The onset was prolonged. It seems possible that venous bleeding which starts as a very small lesion and then spreads, may be a reasonable interpretation. If this were thrombosis you would have to postulate involvement of a very small artery, unless it is thought that there was partial occlusion and then thrombosis.

Dr. Romano: There was sequential localization in respect to the left arm, leg, and face; there may have been venous oozing into the right peduncular area, secondary to thrombosis.

Dr. Eugene B. Ferris: What about blood pressures? I think it might be possible to tie in some cardiovascular accident in association with the cerebral signs. The patient had myocardial disease, may he have had a myocardial infarct as the basis for the cerebral disturbance? Did local cerebral softening occur due rather directly to low blood pressure and in association with previously diseased cerebral vessels?

Dr. Aring: He did have the signs of myocardial infarction; during his course in the hospital the blood pressure was maintained according to the available record. However, most hospital charts are not adequate evidence to settle the question raised by Doctor Ferris. I believe that the mechanism which he had noted is responsible in a fair number of cases, for local cerebral softening.

Dr. Romano: One must remember also that uremia set in.

Dr. Howard D. McIntyre: The case seems too obvious to have been chosen for a clinical pathological conference. The clinical fact of slow progression would lead me to think more of the metastatic carcinoma than vascular disease.

Dr. Romano: I thought of that too with the progressive clinical development, but there

was no evidence whatsoever of primary carcinoma.

Discussion of Pathology

Dr. I. Mark Scheinker: The kidney contained vascular changes similar to those that will be described in the brain, in addition to atherosclerosis. There were small areas of infarction in the heart. The adrenal glands, liver, and lungs were congested.

On gross examination the brain appeared normal. At the base there was advanced sclerosis of the vessels of the circle of Willis. On coronal sections through both hemispheres there were signs of congestion particularly obvious in the white substance of the frontal and temporal lobes. The microscopic examination disclosed vascular changes scattered throughout the central nervous system and confined to the smaller arteries, characterized by tremendous expansion of the intima and narrowing or complete obliteration of the vessel lumen (Figure 1). The lining endothelial cells were relatively well preserved and the subendothelial tissue had undergone an advanced degree of hypertrophy and proliferation. The elastic membrane occasionally was split into concentrically arranged elastic rings. Degenerative changes, such as hyalinization of the intima or atheromatous plaque formation, were not observed. The media and adventitia were relatively well preserved. Rarely the media had undergone moderate secondary atrophy.

Lesions of the nervous tissue, secondary to the vascular alterations, consisted of disseminated, small focal areas of softening in the central nervous system, which may be illustrated in a section from the brain stem stained by the method of Loyez (Figure 2). One focal area of softening destroyed the mid portion of the right peduncle just before the emergence of the third nerve from the brain stem; the adjacent portion of the substantia nigra and red nucleus were also destroyed (Figure 2). The cells of the third nerve nucleus were relatively well preserved on both sides. Another area of recent softening destroyed the mesial portion of the left pyramidal tract in the brain stem at the pontine level (Figure 2).

The lesion in the right midbrain was re-

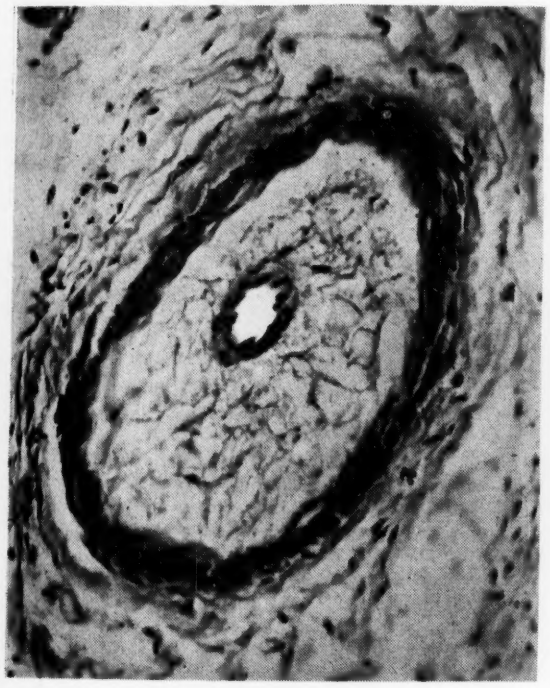


FIGURE 1

FIGURE 2

Fig. 1: A small artery of the pons to show the enormous expansion of the intima which nearly obliterates the lumen of the vessel. Cresyl violet. x 220.

Fig. 2: A section of the brain stem at the junction between midbrain and pons. Note multiple, small areas of softening in the right cerebral peduncle and in contiguous portions of the substantia nigra and red nucleus, and in the pyramidal tract fibers on the left side of the pons. Loyez. x 5.

sponsible for the left hemiplegia and the right third nerve palsy (Weber syndrome). The relative preservation of the third nerve nuclei explains the external character of the opthalmoplegia.

The destruction of the pontine pyramidal fibers on the left produced the terminal picture of supranuclear palsy (dysarthria and dysphagia).

In conclusion it may be said that these histopathologic findings had not been previously described; we have termed this vascular disorder "obliterative cerebral arteriosclerosis."[2] It may be found either in combination with sclerosis of larger arteries or independent of it. Despite a vague morphologic resemblance between this obliterative type of cerebral arteriosclerosis and the hyperplastic form of arteriolosclerosis significant discrepancies may be demonstrated between the two conditions. These differences may be summarized as follows: (a) The vascular alterations in hyperplastic sclerosis involve the entire vessel wall including media and adventitia. In obliterative arteriosclerosis the essential change is in the inner layer of the vessel wall and does not involve the media and adventitia, (b) Although intimal proliferation occurs in both conditions, in hyperplastic sclerosis this proliferation is usually associated with degenerative changes such as hyalinization or fatty degeneration, changes which are not observed in obliterative arteriosclerosis, (c) marked cellular proliferation of the subendothelial connective tissue, frequently found in the early stage of obliterative arteriosclerosis, has not been noted in hyperplastic arteriosclerosis.

Clinical Diagnosis

Multiple areas of softening in the cerebrum resulting in supranuclear palsy.

Hypertensive and arteriosclerotic cardiovascular disease with angina pectoris.

Arteriolonephrosclerosis.

Doctor Romano's Diagnosis

Diffuse disease of the small arteries of the brain, heart, kidney associated with arteriosclerosis, resulting in multiple softenings of the brain.

Weber's syndrome, right.

Supranuclear palsy.

Anatomical Diagnosis

Obliterative arteriosclerosis of the brain and the kidneys.

Myocardial infarctions.

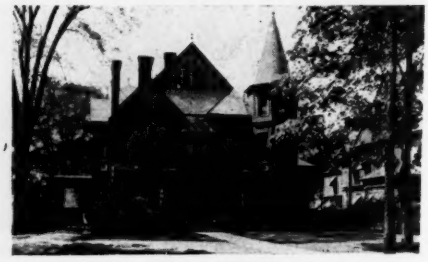
Generalized atherosclerosis.

Congestion of the viscera.

REFERENCES

1 List, C. F., and Pimenta, A. DeM.: "Sweat Secretion in Man; Spinal Reflex Sweating," *Arch. Neur. Psychiat.*, 51: 501-507, 1944.
2 Scheinker, I. M.: "Obliterative Cerebral Arteriosclerosis," *Am. J. Path.* (In Press).

HOSPITAL AND CLINIC FOR SALE—A well equipped three story brick building with full basement and a large, shady yard. Thirty-five beds for nervous diseases, mild mental cases, liquor and drug addictions. Established for more than 25 years. Strictly ethical, located in a large mid-Western city. Reason for selling—retirement. For complete particulars address inquiries to ADVERTISER, BOX 104,
Physicians Postgraduate Press
500 N. Dearborn St., Chicago 10, Illinois



TWIN ELMS
A Modern Psychiatric Unit
Selected drug and alcohol problems welcome.
Rates moderate.
EUGENE N. BOUDREAU, M.D., *Psychiatrist*
R. STUART DYER, M.D., *Assistant Psychiatrist*
SYRACUSE, N. Y.

Two Important Post-War Problems in Neurological Surgery

ERNEST SACHS, M.D.
St. Louis, Missouri

The two most important war problems in neurological surgery are the late treatment of gunshot wounds of the head and, secondly, peripheral nerve injuries. Gunshot wounds of the head still constitute to a large extent an unsolved problem. The most serious feature is the development of epilepsy. We do not know definitely how frequently it occurs or how to recognize the cases that are going to develop it and how best to deal with them.

It is very striking that the incidence of epilepsy following fractures of the skull in civil life is far less frequent than in war wounds and, of course, one obvious difference is that in the war cases compound fractures are much more common. In the first World War the British appointed a Commission to study this and reported at the end of one year about two per cent of epilepsies, at the end of five years 10 to 15 per cent and now Ashcroft has published a final follow-up of the same cases, and reports the incidence of epilepsy to be 34 per cent. In this study he has further pointed out that epilepsy was twice as frequent in patients in whom the dura had been penetrated as in those in whom it was intact. Forty-five per cent developed epilepsy in the first group while 23 per cent of the second group developed epilepsy.

Scalp wounds due to missiles are more likely to be followed by epilepsy than those inflicted by a blow with a blunt instrument as occurs in civil life. The longer the patient had a suppurating wound, the more frequently did the patient develop epilepsy. Convulsions may develop as late as 20 years after injury though most convulsions start in the first weeks or months and it is unusual for a patient to develop convulsions after five years.

Much emphasis is laid on the repair of skull defects and a considerable literature has already developed on this phase. Twenty-five years ago celluloid plates or bone grafts were used; today almost everybody in the Army and Navy has been using tantalum plates. In some Naval hospitals they created a bone bank and have had very satisfactory results. But closing these bone defects does not get at the crux of the matter. The convulsions are due to the injury of the pia arachnoid or brain and the associated scar. Of course, we should prevent the scar as far as possible by excising all traumatized brain tissue with an electric knife and replacing the dura and arachnoid with that marvelous new substance discovered by Professor E. Cohn of Harvard, sheets of fibrin film. This probably is better than using fascia to make new dura, as done in the past. The all important thing is to excise all tissue that may form scar.

Can we predict beforehand that a certain patient is going to develop epilepsy? In a large number of cases, once the epilepsy has developed, it continues in spite of surgery. It may be that the surgery has been inadequate but the fact is these patients usually continue to have convulsions. The extensive use of electro-encephalography may be the answer—I certainly hope so. In my hands it has not been very helpful, certainly not in tumors, but if we can discover a characteristic change of pattern weeks or months or years before the convulsions begin, it may be an indication for doing an early operation and thus effecting a possible cure. Up to the present time we have operated only after the patient has a convulsion; we must get him earlier.

In summing up this chapter, I should say: Debride properly at the time of accident, use fibrin film to replace dura that has been lost and try to recognize the cases early with electro-encephalography.

Regarding the peripheral nerve problem, we are far better informed on this subject. We know what are the essential factors for good nerve healing. Most of these were laid down by Huber, Dean Lewis, Frazier, Pollock and Davis and others in the first World War. They recognized that to get nerve regeneration the following points are necessary:

1st: Both ends of the nerve must be exposed.

2nd: The neuroma on the central end must be excised until the bare axis cylinders are exposed. The nerve must be excised with a razor, not a scissors, as the latter crushes the nerve sheaths and the scar on the peripheral end must be excised until the empty medullary tubes are exposed.

3rd: The ends must be brought together, without tension. The neurolemmal sheath must be brought together with fine silk or tantalum wire or if the ends cannot be brought together they may be laid into a bed of plasma clot as devised by Tarlov and Weiss so that the axis cylinders have a bridge over which they may grow.

DETROIT MEDICAL HOSPITAL

7850 East Jefferson Street — Detroit 14, Michigan

TELEPHONE: FITZROY 7100

A private hospital devoted to the diagnosis and treatment of mental and nervous illnesses. All accepted psychiatric and mental therapies. Beautiful grounds on the Detroit River.

Registered by A. M. A. *Licensed by Michigan State Hospital Commission*

SAINT JOSEPH SANITARIUM

(Supervision of Sisters of Mercy)

P. O. BOX 236 — DUBUQUE, IOWA

or phone 526 for information

Mild Mental and Nervous Cases

also

Rheumatism, High Blood Pressure, Neuritis, Obesity, and all Types of Convalescents

Modern Hydrotherapy, Baths and Massage

Insulin Therapy *Resident Physician*

BALDPATE, Inc.

Georgetown, Massachusetts

Located in the hills of Essex County, thirty miles north of Boston.

For the treatment of neuroses, personality disorders, psychoses, alcoholism and drug addiction.

Psychotherapy is the basis of treatment; other methods such as shock therapy, malaria and fever box are used when indicated.

Occupational therapy, outdoor activities, picnics and other diversions.

GEORGE M. SCHLOMER, M.D., Medical Director